REMARKS

The Examiner is thanked for the due consideration given the application. Attached to this paper please find a declaration signed by the inventor and a published article by Louis Olivier et al., *Catalysis Today* (2009).

Also, the amendment is being filed concurrently with a Request for Continued Examination.

Claims 24-26, 31-32, 34-37 are pending in this application. Claims 38-45 have been withdrawn from consideration. Claim 33 has been canceled without prejudice. Claim 24 has been amended to generally incorporate the subject matter of canceled claim 33.

No new matter is added to the application by this amendment.

Art Rejections

Claims 24-26, 31-34, 36 and 37 have been rejected under 35 USC §103(a) as being unpatentable over CHEN et al. (U.S. Patent 6,187,157). Claim 35 has been rejected under 35 USC §103(a) as being unpatentable over CHEN et al. in view of HAZBUN (U.S. Patent 4,791,079).

These rejections are respectfully traversed.

The present invention pertains to an oxygen conducting membrane that includes a mixed conducting dense membrane of multimetal oxide, one surface of which is covered with dispersed particles based on magnesium oxide or noble

metals. The particles based on magnesium oxide or noble metals represent from 0.01 to 0.1% by weight of the dense membrane. See independent claim 24.

Distinction of the present invnetion over CHEN et al. and HAZBUN et al. have been made of record in the application. For brevity, these distinctions are not repeated here.

In addition, neither CHEN et al. nor HAZBUN et al. teaches a membrane comprising a multimetal oxide having the formula $Ba_{0.5}$ $Sr_{0.5}$ $Co_{0.8}$ $Fe_{0.2}$ O_{3-z}, covered by 0.01 to 0.1 % wt of dispersed paliicles of magnesium oxide or noble metals according to the instant claims.

More precisely, only examples 1, 2 and 3 of CHEN et al. give detail about the ratio of metal used, i.e. 20% wt (Column 13, line 35 - Column 14, line 39 and Column 15, line 23).

Moreover, only example 2 of HAZBUN et al. disclose the ratio of metal used, i.e. from 0.5 to 15% wt of silver (Column 9, lines 21-23), in particular 8% (Column 9, line 35).

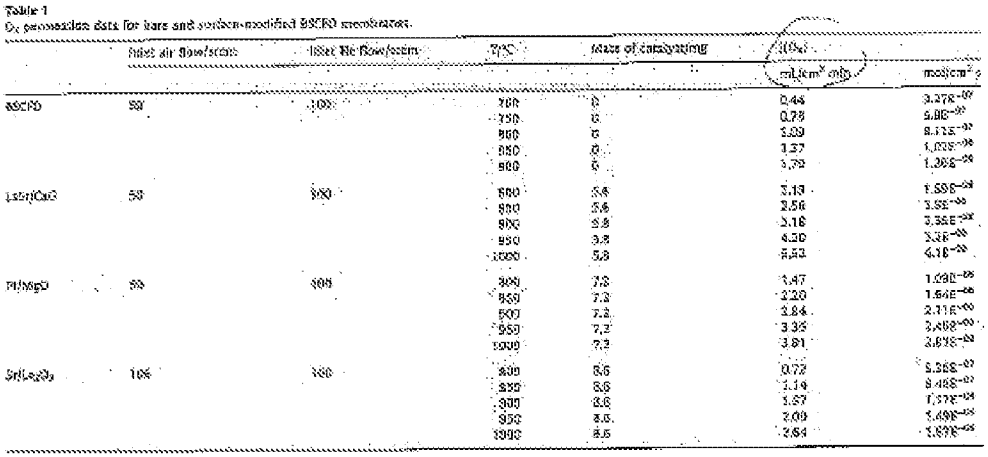
That is, the membranes of CHEN et al. and HAZBUN et al. contain much more metal catalyst than the claimed membrane and the appplied art **does not suggest that a lower ratio of metal could be used.**

On the other hand, the claimed membrane not only allow using less noble metal or magnesium oxide catalyst, which is economically advantageous in terms of cost, but the claimed membrane also advantageously exhibits **better oxygen fluxes** than membranes of the prior art. (See Page 9, paragraph 3 of the present application.)

As discussed in the previously filed amendment, the unexpected result is clearly presented in the attached article, now published.

Table 1 of the attached article, which is reproduced below, describes a 1 mm thick Pt/MgO coated $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-z}$ membrane (table 1, page 36). The exemplified membrane contains 7.2 mg of Pt/MgO (table 1) for approximately 0.5 g perovskite (paragraph 35, colomn 1 "membrane materials"), i.e. about 0.014%wt of Pt/MgO. This membrane thus corresponds to the claimed membrane.

Regarding the oxygen flux, as reported in table 1, the oxygen flux at 900 °C of a 1 mm thick Pt/MgO coated $Ba_{0.5}$ $Sr_{0.5}$ $Co_{0.8}$ $Fe_{0.2}$ O_{3-z} membrane is ***2.84*** ml/cm^2 min.



On the other hand, the best oxygen flux reported in CHEN et al. which describes that the oxygen flux at 900°C of the membrane of example 1 (Ag coated $La_{0.os}$ $Sr_{0.95}Co$ O_{3-X}) is ***2*** ml/cm^2 min (From figure 4, for a 1 mm thickness) and the one of example 3 (50Pd/50Ag coated $Ce_{0.8}Gd_{0.2}$ O_{2-X}) is ***0.06*** ml/cm^2 min.

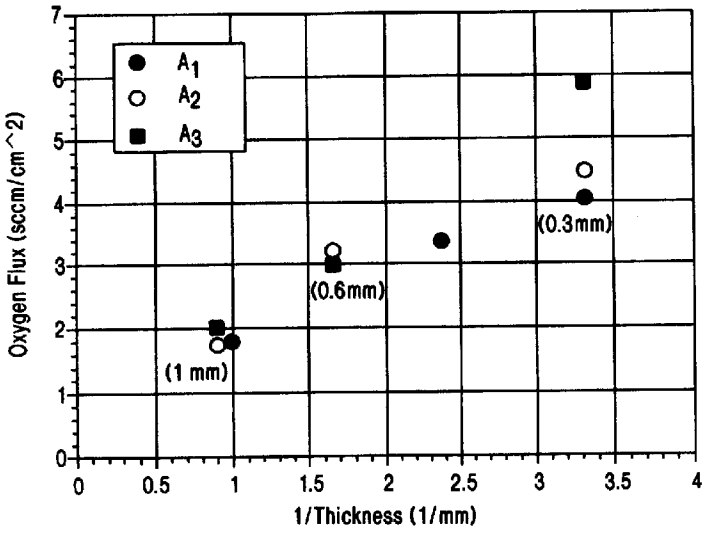


FIG. 4

As can be seen, the oxygen flux shown in the attached article is 40% higher than the best oxygen flux reported by CHEN et al. This improvement of the oxygen flux is

an ***unexpected result*** that clearly cannot be inferred from the technology of CHEN et al.

The Advisory Action asserts that the evidence of unexpected results must be factually supported by a declaration.

In response to the Advisory Action, a declaration signed by a co-inventor is attached to this paper, along with his resume. The declartion demonstrates that the claimed oxygen conducting membrane exhibits better oxygen fluxes than the membranes of CHEN et al., as disccused above.

As a result, the data of unexpected results set forth in the attached declaration fully rebut any unpatentability that can be alleged.

As discussed above, neither CHEN et al. nor HAZBUN et al. teach or infer all the elements recited in the instant claims. One of ordinary skill and creativity in the art would thus fail to produce a claimed embodiment of the present invention from a knowledge of CHEN et al. or the combination of CHEN et al. and HAZBUN et al. A *prima facie* case of unpatentability has thus not been made.

Also, the present invention displays unexpected results, as discussed above and set forth in the attached Declaration.

These rejections are believed to be overcome, and withdrawal thereof is respectfully requested.

Request for Rejoinder

As allowable subject matter has been indicated, rejoinder and consideration of all the claims on the merits is respectfully requested.

Conclusion

The rejections are believed to have been overcome, obviated or rendered moot and that no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

Should there be any matters that need to be resolved in the present application. the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,
YOUNG & THOMPSON

/Robert E. Goozner/

Robert E. Goozner, Reg. No. 42,593
Customer No. 00466
209 Madison Street, Suite 500
Alexandria, VA 22314
Telephone (703) 521-2297
Telefax (703) 685-0573

REG/HC/hc

APPENDIX:

The Appendix includes the following items:

☒ - a 37 CFR 1.132 Declaration

☒ - a resume of David Farrusseng

☒ - an article: Catalysis Today, February 13, 2009, LOUIS et al.: "Oxidative coupling of methane using catalyst modified dense perovskite membrane reactors" 142 (2009) 34-41.